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ABSTRACT

The Cognitively Oriented Prekindergarten Experience (Project COPE) is a preschool effort to accelerate the development of children from predominantly low-income families. This program was nationally validated as an ESEA Title III project and has received support from the U.S. Office of Education as a National Developer/Demonstrator site. Having recently completed its third year of operation, it is the objective of this paper to present three-year evaluation results of the program and to draw implications from these results as to the program's potential for meeting the needs of the disadvantaged child as well as preschool children in general. Statistical analysis of Pre-and posttest data showed substantial and significant gains on all measures of intellectual, language, and social development as well as on measures of reading and math achievement. (Author/RC)

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A THREE-YEAR EVALUATION OF A NATIONALLY VALIDATED PREKINDERGARTEN

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A THREE-YEAR EVALUATION OF A NATIONALLY VALIDATED PREKINDERGARTEN

The Cognitively Oriented Prekindergarten Experience (Project COPE) is a preschool effort to accelerate the development of children from predominantly low-income families. This program was Nationally Validated as an ESEA Title III project and has received support from the U.S. Office of Education as a National Developer/Demonstrator site. Having recently completed its third year of operation, it is the objective of the present paper to present three-year evaluation results of the program and to draw implications from these results as to the program's potential for meeting the needs of the disadvantaged child as well as preschool children in general.

Background and Objectives

In recent years, the city of West Chester, Pennsylvania, has been the focus of an influx of low-income families from larger urban centers such as nearby Philadelphia, Chester and Wilmington, as well as from neighboring rural farming areas. The growing number of children from poverty backgrounds in the West Chester Area has created serious educational problems for this moderate-sized urban community located in Pennsylvania's fastest growing county. Since research has shown that children from impoverished families enter school with a learning disadvantage which does not enable them to do well throughout their schooling, efforts were undertaken to dissipate such disadvantage before these children even entered the schools.

The Educational Development Center at West Chester, designated as a State Center for Urban and Bilingual Education Studies, together with West Chester State College have, over the past several years, been involved in a wide variety of developmental educational programs for children from low-income families aimed at elevating the educational achievement levels of these children to the point at which they are able to compete adequately within the school system. In response to expressed community needs a considerable preschool effort was begun in the Spring of 1968 with the above types of children to attempt to prevent the very kinds of educational problems for which remedial programs had become necessary. This effort developed jointly by the Pennsylvania Department of Education, the Educational Development Center at West Chester and West Chester State College has come to be known as the Pennsylvania Research in Infant Development and Education Project (Dusewicz, 1970, 1975; Dusewicz and Higgins, 1971, 1972; Dusewicz and O'Connell, 1973). Beginning as early as 12 months of age with predominantly Black and Puerto Rican children, this program has significantly accelerated the overall educational development of the participating children.

The significant gains in achievement of the children and the successful operation of this Early Learning Program manifested the need for an extended program to forestall any intellectual, language, social and emotional regression and to continue the high achievement and motivational levels of these children. A Prekindergarten was thus developed as a transitional program to provide for additional cognitive growth and to equip these children with the preacademic skills necessary to compete adequately within the formal school system.

The curriculum utilized for the very effective Early Learning Program provided the main thrust for the construction of the extended curriculum incorporated in the present COPE Project.

The Prekindergarten was originally comprised of children from economically disadvantaged families. All of the children had participated for two years in the Early Learning Program of the Pennsylvania Research in Infant Development and Education Project and had been randomly selected from a large pool of eligible children at the time of original entrance into the Project. It was anticipated that the Early Learning Program and the Prekindergarten Program would complement each other in enhancing the intellectual, language and socio-emotional development of disadvantaged children and prevent the kind of school failure which stems from achievement deficits that accumulate upon initial school-entrance deficits.

The principal operational objectives of the Prekindergarten relate to each of the following individual areas of development or achievement: (1) Intellectual Development, (2) Language Development: (3) Social Development, (4) Reading Achievement, (5) Mathematics Achievement.

For each of the above areas, it was the objective of the COPE Program that the participating children would be able to not only successfully resist any tendency toward regression in each of these areas of development or achievement but also exhibit a significant and greater than normal gain in each over the program period.

Program Description

The Prekindergarten was operative from October through April each of the years from 1972-75, with classes conducted every weekday for three-hour sessions. During the three-year period of operation, 105 children participated in the program. The 65 children attending during the first two years were all from low-income families. They ranged in age from 37-51 months and the majority were from single-parent homes whose sole income was from public assistance. The 40 children constituting the group of participants in the third year of the program were approximately two-thirds from low-income families and one-third from middle-income families.

Presented below, in Table 1, is a profile of the participants for each year of the program.

Table 1

Participant Characteristics

Characteristic	Year 1	Year 2	Year 3
# Participating Children	35	30	40
Per cent Low-Income	100%	100%	70%
Per cent Middle-Income	0%	0%	30%
# Girls	23	17	11
# Boys	12	13	29
Entrance Age Range (mos.)	42-51	37-51	35-45
Mean # Siblings	1.3	2.4	1.9
# From Single-Parent Homes	23	17	18
Age Range of Mothers (yrs.)	18-46	16-42	17-39
Per cent of Families Receiving Public Assistance	> 50%	> 50%	> 40%

Critical Elements

COPE utilizes two curricula, one developmental and the other achievement oriented. Each curriculum has its own unique content areas, but yet both share eight common essential elements for program success. These elements are as follows:

1. Developmental Hierarchies: Objectives are undertaken is a sequence of least to most difficult.
2. Individually Paced Learning: Children learn at their own pace and move on to a new objective only when mastery of the present one is attained to a specified criterion.
3. Extended Curriculum Range: The wide range of difficulty in objectives accommodates children of various rates of development and levels of achievement.
4. Diversity of Activities: The variety of materials and experiences at each level in the hierarchical sequence allows the opportunity for staff to choose program activities to best tap the interests and abilities of each individual child.
5. Mixed Instructional Modes: Small group, large group, individual instruction, free play and self-initiated projects are all part of the child's daily experiences. They provide the kind of variety and flexibility which maximizes motivation and learning.
6. Development of Positive Self-Concept: All program experiences enable the teacher to create an atmosphere for the children to acquire awareness of their own growth and the part each plays in bringing it about.
7. Low Child/Adult Ratio: An 8:1 child/adult ratio in the classroom is recommended and usually calls for a teacher and two aides or volunteers for a group of 24 children.
8. Balanced Program Content: The program emphasizes both basic development and learning, thus seeking to meet the needs of the whole child in a comprehensive way.

Curriculum Areas

The Developmental Curriculum provides a full range of activities from those which systematically reach precisely defined objectives to those whose purpose is, simply, creative expression, and free interaction with the environment. Child-initiated learning augments teacher-directed activities. Children become better able to learn from and understand their experiences, more aware of their individual worth as well as social responsibilities, and more in control of their physical environment and means of creative expression.

Perceptual Motor Development activities represent a large portion of the Developmental Curriculum and are aimed at increasing children's sensory awareness and functioning. By mastering, first gross, then fine discrimination tasks within each of the senses, children develop greater awareness of the differences and the similarities among objects. Next, sensory integration strengthens their ability to associate perceptions from two or more different senses. Hierarchically arranged eye-hand coordination activities, not only increase visual discrimination and fine motor skills, but also aid children in developing rhythmic eye movement, left-to-right progression habits and the ability to keep their place on a page. Activities in art, music, and physical movement round out this area of the curriculum.

Conceptual-Language Development activities accelerate as competence in related perceptual development skills is acquired. Emphasis is placed on vocabulary acquisition and the interrelating of concepts, such as color, shape, and size. Object and event relationships are also explored, including classification, association, sequencing, spatial relationships, same and different concepts, and dimensional relationships.

Socio-Emotional Development permeates every facet of the COPE curriculum. Children are provided with opportunities for role playing, assuming responsibility, child-child and child-adult relationships. Experiences such as these enhance children's self-concepts and increase their social responsibility. And, typically, this contributes to improvement in their performance levels in other areas.

Skills and concepts presented in the Achievement Curriculum are built upon learnings from the Developmental Curriculum. Reading and mathematics skills are stressed, being developed sequentially and taught on a daily basis. Though mostly teacher-directed, children actively participate and manipulate materials. Science, Social Studies, and Health and Safety are developed through specialized learning units.

Reading activities are divided into those for readiness, those for formal instruction, and those for extension. In COPE, reading is a sequential, developmental and teacher-directed experience.

Readiness activities rely on skills the children bring from the Developmental Curriculum and, typically, it's only a short time before those who are ready begin formal reading instruction.

In COPE, the Total Environment Room plays a unique role in formal reading instruction and vocabulary introduction. This is true insofar as it enables complete environmental control and elimination of outside distractions. Word symbols and corresponsing pictures are projected. Children use left-to-right progression skills as well as contextual clues to identify the new word.

With the COPE reading procedure, children not only maintain a high interest level but also demonstrate an increased ability to comprehend what they read.

Mathematics instruction consists of highly structured units, hierarchically sequenced, each concerned with one basic math concept. Children learn to deal with quantitative measures and qualitative measures, numerals, numbers and sets. They learn to identify and assign appropriate numerals to sets. They learn to specify whether comparisons of different sets are more than, less than, or the same as one another. They acquire an accompanying understanding of the symbols used. Children also demonstrate an understanding of one-to-one correspondence through matching.

Reinforcement activities extend understanding of the concepts presented in instructional units. For those children who display readiness, there are lessons at the end of the mathematics section of the Achievement Curriculum which introduce the mathematical operations of addition and subtraction.

Science activities are designed to help children explore and discover their environment through active interaction with their surroundings. Typically,

the children are involved in identifying magnetic objects, transforming ice into water, watching planted seeds grow and observing chick eggs hatch. Moreover, by caring for plants and animals, the children see the necessity of water, sun, soil, food and the like in developing and perpetuating life. They also learn about the four seasons and changing weather conditions as well as their effect on people's dress, play, work and feelings.

Social Studies activities provide the children with first-hand experiences that allow them to deal with and relate to their immediate social environment. Units of instruction include community helpers, transportation, family living, city living/farm living, people in other lands and holidays and are used to develop an awareness within the children of their relation to the community and world around them.

Health and Safety strives to develop and instill within the child a positive self-concept and sense of personal responsibility. Children engage in activities and use materials that enable them to explore and come to an understanding of their positive and negative feelings. Cleanliness and personal grooming are stressed, especially insofar as washing of hands and face, brushing teeth, and combing hair.

Proper dress for differing weather conditions is also handled. Finally, rules of safety in the home, school and on the playground are emphasized.

Program Evaluation Results

In order to objectively assess the effects of the Cognitively Oriented Prekindergarten Experience on the overall growth and development of the participating children, a large battery of assessment measures was administered to each child during the two-week period preceding the start of the program and again during the two-week period following the close of the program for each of the three developmental years from 1972-75. Each child participated in testing for only one day of the two-week period. Tests were administered with the child and tester alone and without interruption in a pleasant but undistracting atmosphere. Between testing sessions the child engaged in free play activities.

The tests covered the developmental areas of intelligence, language, and social growth, as well as the more specific achievement areas of reading and mathematical skills. Following is a list of the tests utilized in this pre-post evaluative design:

Developmental Areas

Slosson Intelligence Test (SIT)
Peabody Picture Vocabulary Test (PPVT)
Verbal Language Development Scale (VLDS)
Vineland Social Maturity Scale (VSMS)

Achievement Areas

Gates-MacGinitie Reading Test (GM)
Preschool Assessment of Reading Test (PAR)
Preschool Assessment of Mathematics Test (PAM)

The results of testing and the gains exhibited by program participants must be viewed in terms of at least two different referents, the normal program period and the inter-test interval. While the mean inter-test interval over the

three-year period amounted to seven months, the normal program period, including approximately one and one-half months each year for closings for holidays and recesses, amounted to only six months due to an unusual and cumbersome mid-year shut-down and start-up procedure associated with and necessitated by the mid-semester break at West Chester State College, whose classroom facilities were being utilized by the program.

First Year

In terms of overall intellectual, language, and social growth, as well as reading and math achievement, test results in these developmental areas are presented in Table 2. In this table, both the means and standard deviations (SD) for each of the testing sessions are given. As can be seen from comparisons between pretest means and posttest means, on the average, the Prekindergarten Program participants gained developmentally in the areas of mental growth, hearing vocabulary, general language ability, and social skills. The results of correlated t-tests between pre- and posttest means indicate that all these gains were found to be statistically significant at the .01 level as well.

Table 2

First Year Test Results

Measure[1]	Pretest (Mean)	Pretest (SD)	Posttest (Mean)	Posttest (SD)	t
SIT	51.46	7.01	73.83	10.00	17.92**
PPVT	43.21	8.58	56.18	13.99	6.19**
VLDS	42.32	7.03	63.13	8.63	13.93**
VSMS	51.60	7.68	70.80	6.97	15.22**
GM	9.56	7.33	21.05	18.41	4.67**
PAR	2.00	8.28	20.91	20.41	6.85**
PAM	25.65	11.87	46.50	15.88	9.31**

[1]Scores given for SIT are mental ages in months. PPVT scores are given in terms of language MA in months. VLDS scores are reported in terms of language age. VSMS scores are in terms of social age in months. Scores given for GM are readiness percentile scores based on a sample beginning first grade. All others are given in total score form.

**$p < .01$

The mean gain in mental age from pre- to posttest on the Slosson Intelligence Test, as derived from the table, was calculated to be 22.37 months. When apportioned over the inter-test interval or the program period, this represents a mean gain in mental age more than three months for every month in the Prekindergarten Program, that is more than three times the normal intellectual growth rate.

In terms of hearing vocabulary, as measured by the Peabody Picture Vocabulary Test, the mean language MA's reported in the table, show the children beginning initially at about the 43 month level and ending at the 56 month level. This yields a gain of 13 months in hearing vocabulary over the program period, for

a rate of gain about two times the normal. On the Verbal Language Development Scale, the mean language age of 42.32 on the pretest and posttest score of 63.13 demonstrates a greater than normal rate of growth in expressive language ability.

Gains in social development, as measured by the Vineland Social Maturity Scale, were also substantial. The social ages in months as given in the table indicate that the children progressed from a mean social age of 4.3 to that of 5.9 years of age. This represents a gain of 1.6 years, or 19 months, in social age which is equivalent to a rate of gain of about three times the normal.

Turning next to a consideration of what may be termed the achievement areas, gains from pre- to posttest were evidenced in both the reading and mathematical skills areas. Correlated t-tests comparing pretest and posttest means further indicated that these gains were of statistical significance at the .01 level.

Children's scores on the Gates-MacGinitie Reading Test increased from about the tenth percentile at the start of the Prekindergarten Program to the 21st percentile at the conclusion of the program year. This means that the participating children, at the end of their prekindergarten year, ranked at the 21st percentile in reading readiness when compared with children nationally who were a year their senior and who were just beginning first grade. On the Preschool Assessment of Reading Test, which measures both word recognition and comprehension, a similar gain was achieved. On this latter test, the participating children exhibited a mean pre-post gain of about 19 points out of a maximum possible score of 100 points, representing an improvement of more than 900 per cent over the pretest achievement level.

The Preschool Assessment of Mathematics Test, PAM, used to assess mathematical achievement was designed to measure understanding of a wide variety of quantitative and qualitative mathematical concepts. The pre-post gain of about 21 points on this test, out of a possible 100 points, represents nearly an 80 per cent improvement over the pretest score for the participating children in the Prekindergarten Program. This statistically significant difference is indicative of a substantial program induced effect in this area of achievement.

Second Year

As can be seen from comparisons between pretest means and posttest means in Table 3, on the average, the second-year Prekindergarten Program participants also gained developmentally in the areas of mental growth, hearing vocabulary, general language ability, and social skills. The results of correlated t-tests between pre- and posttest means indicate that all these gains were found to be statistically significant at the .01 level.

The mean gain in mental age from pre- to posttest on the Slosson Intelligence Test, as derived from the table, was calculated to be 18.25 months. When apportioned over the program period, this represents a mean gain in mental age of about three months for every month in the Prekindergarten Program or three times the normal intellectual growth rate.

In the area of hearing vocabulary, as measured by the Peabody Picture Vocabulary Test, the mean language MA's reported in the table show the children beginning initially at about the 39 month level and ending at the 53 month level. This yields a gain of 14 months in hearing vocabulary over the program period, for a rate of gain of about two times the normal. On the Verbal Language Development Scale, the mean gain in language age, derived from the table, is 10.79. This represents a rate of growth in verbal language of greater than the normal over the program period.

Gains evidenced in the area of social development, as measured by the Vineland Social Maturity Scale, showed a statistically significant gain over the program period at about the normal rate of growth.

Table 3

Second Year Test Results

Measure[1]	Pretest (Mean)	Pretest (SD)	Posttest (Mean)	Posttest (SD)	t
SIT	55.50	7.39	73.75	9.76	12.13**
PPVT	39.28	8.20	53.28	10.81	8.35**
VLDS	47.39	5.95	58.18	5.62	7.76**
VSMS	60.58	7.71	67.57	8.13	3.91**
PAR	0.28	0.96	25.22	16.02	6.77**
PAM	14.21	12.33	44.97	17.07	11.68**

[1] Scores given for SIT are mental ages in months. PPVT scores are given in terms of language MA in months. VLDS scores are reported in terms of language age in months. VSMS scores are in terms of social age in months. Scores for PAR and PAM are given in total score form.

**$p < .01$

In the achievement areas, gains from pre- to posttest were evidenced in both the reading and matematical skills areas. Correlated t-tests comparing pretest and posttest means further indicated that these gains were of statistical significance at the .01 level.

On the Preschool Assessment of Reading , which measures both word recognition and reading comprehension, a substantial gain was achieved. On this test, the participating children exhibited a mean pre-post gain of about 25 points out of a maximum possible score of 100 points, representing a highly significant improvement over the pretest achievement level.

The Preschool Assessment of Mathematics Test, used to assess mathematical achievement,was designed to measure understanding of a wide variety of quantitative and qualitative mathematical concepts. The pre-post gain of about 31 points on this test, out of a possible 100 points, represents a highly significant improvement over the pretest score for the participating children. The difference is indicative of a substantial program induced effect in this area.

Third Year

In the third year, the Verbal Language Development Scale and Vineland Social Maturity Scale were dropped from the battery of tests to be administered in order to shorten and simplify the pre- and posttesting sessions.

Table 4 shows comparisons between pretest means and posttest means for the third-year program and illustrates the substantial gains achieved by the participating children. Results of correlated t-tests between pre- and posttest means indicate that all gains were statistically significant at the .01 level. These results represent the pooled group of third-year children from both low- and middle-income families since separate analyses by income level yielded similar results with no significant income-related differences.

Table 4

Third Year Test Results

Measure[1]	Pretest (Mean)	Pretest (SD)	Posttest (Mean)	Posttest (SD)	t
SIT	48.60	10.86	61.68	12.49	13.14**
PPVT	38.74	12.98	54.85	20.09	7.47**
PAR	1.83	11.00	19.78	18.52	6.33**
PAM	20.17	17.27	41.50	21.17	10.26**

[1]Scores given for SIT are mental ages in months. PPVT scores are in terms of language MA in months. PAR and PAM scores are represented by total test scores.

**$p < .01$

The mean gain in mental age on the Slosson Intelligence Test, as derived from the table, was calculated to be 13.08 months. This represents a gain of about two months for every month in the program. In terms of mean gain in language MA, as measured by the Peabody Picture Vocabulary Test, the figure calculated from the table is 16.11 months. This represents a language gain of over two months for every month in the program or a rate of gain equivalent to more than two times the normal. In both intellectual and language development, therefore, the Cognitively Oriented Prekindergarten appears to have met or surpassed its objectives.

On the Preschool Assessment of Reading Test and the Preschool Assessment of Mathematics Test substantial gains of 17.95 and 21.33, respectively, were observed from computations based on the table. These gains represented, in turn, improvements of 981 per cent and 206 per cent over pretest scores.

Summary Statistics

Table 5 represents summary statistics for all three years of program operation during its development period. Respective mean pretest and posttest scores are listed as well as mean gains. Missing data for certain tests are a result of their not being administered during those particular program years.

Conclusions

By all standards, the Cognitively Oriented Prekindergarten must be judged a success. It gained a high degree of community support and parent interest and cooperation. It engendered a number of positive behavioral changes in the participating children, and the intellectual, language and social growth of these children was significantly enhanced as a result of the program.

While the preceding results and summary statistics have answered many questions with respect to the effectiveness of the COPE program, a number of additional questions have been raised by these findings.

Probably the most significant of these relates to the fact that the participants in the Prekindergarten did actually undergo some form of preschool educational training during the two-year period immediately preceding their enrollment in the Prekindergarten Program. Although this represents a highly desirable continuity of "compensatory" educational programming for the children from low-income families, there are no definitive indications as to whether or not this Prekindergarten Program would be as effective with children who have had no formal educational programming prior to their prekindergarten experience. Thus, in providing for what may approach the ultimate in preschool program continuity, some generalizability of the results may have been lost as a consequence due to possible program effect interactions with prior years.

Upon closer examination of this latter point, however, quite the opposite conclusion may hold at least equal merit. The enrollment of the participating children in a previous two years of a preschool program need not necessarily be a factor in enhancing the effectiveness of the Prekindergarten Program with respect to achieved gains because:

Table 5

Summary Program Statistics

Test Measure	1972-73			1973-74			1974-75			Overall Mean Gain
	Pretest	Posttest	Gain	Pretest	Posttest	Gain	Pretest	Posttest	Gain	
SIT (MA in months)	51.46	78.83	22.37	55.50	73.75	18.25	48.60	61.68	13.08	17.90
PPVT (Language MA in months)	43.21	56.18	12.97	39.28	53.28	14.00	38.74	54.85	16.11	14.36
VLDS (Language age in months)	42.32	63.13	20.81	47.39	58.18	10.79				15.80
VSMS (Social age in months)	51.60	70.80	19.20	60.58	67.59	7.01				13.11
GMRT	9.56	21.05	11.49							11.49
PAR (per cent)	2.00	20.91	18.91	0.28	25.22	24.94	1.83	19.78	17.95	20.60
PAM (per cent)	25.65	46.50	20.85	14.21	44.97	30.76	20.17	41.50	21.33	24.31
Mean Days in Attendance	86.4			79.4			86.6			84.1
Total Days of Program Operation	79			90			103			95.7

1. The achievement of marked gains in prior years (assuming an individual maximum potential within each child) would likely make it more difficult for any succeeding program to produce supplementary gains as the Prekindergarten Program has done.

2. The greatest gains are typically achieved during the initial year of a child's compensatory preschool experience which might suggest that even greater gains might be evidenced if children without any prior contact with the Project were enrolled in the Prekindergarten.

3. The Prekindergarten instructional format and scope of curriculum appear to be able to accommodate a wide range of initial ability levels and encompass, in their initial stages, many aspects and activities encountered in the prior program years of the Early Learning Program of the Pennsylvania Research in Infant Development and Education Project thus providing the capability for overcoming any deficiencies which children not having such prior compensatory experience would present in the Prekindergarten situation.

It is anticipated that future program years will provide additional support for the results presented here; and it is hoped that replications of this program, instituted by other educational agencies elsewhere in the State and Nation will demonstrate the extent of generalizability of these findings to other settings and conditions.

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